

Pilgrim River Salmon Counting Tower
Project Summary Report, 1997

by

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INTRODUCTION

The Pilgrim River counting tower is a cooperative project funded and operated by the Kawerak Corporation. The Alaska Department of Fish & Game (ADF&G) provided equipment for this project. ADF&G analyzed and expanded the tower count data to produce this report, as part of its contribution to this cooperative effort.

The 1997 season was the first year a salmon counting tower has been operated on the Pilgrim River. The project is operated to obtain timely and accurate escapement information required for the active management of the salmon stocks throughout the season. The Pilgrim River begins at Salmon Lake and drains into Imuruk Basin approximately 45 miles north of Nome (Figure 1). Historically this drainage has been the major producer of sockeye salmon in Port Clarence.

OBJECTIVES

To obtain daily and seasonal information concerning the timing and magnitude of the chum, pink, sockeye, king and coho salmon escapement to the Pilgrim River.

METHODS

The Pilgrim River counting tower camp is located on Marys Igloo Village Corporation land, approximately $\frac{1}{2}$ mile upstream from the end of the Pilgrim Hot Springs road (Figure 1).

A tent camp with two tent frames and an outhouse was set up at the end of June. A 15 foot high scaffolding tower was erected on the bank of the river to serve as an observation platform. A 50 x 8 foot vinyl canvas flash panel was placed on the river bottom directly in front of the tower. A weir to direct the fish over the flash panel was built from the mid-stream end of the flash panel to the opposite bank. An array of 120 volt lights was mounted on a post below the tower to illuminate the flash panel during periods of low light and darkness.

Counting began on 12 July and ended on 21 August. The counting schedule was 18 half-hour counts each day from 12 noon to 0600 hours the following day. A 24 hour count and one day off were scheduled weekly. The daily counts considered in this report run from 0000 hours to 2400 hours. The counts for each half hour shift were doubled to produce the reported hourly counts for each species. Each day the reported hourly counts were added to produce a daily unexpanded total. Every day, the daily and cumulative unexpanded totals for each species were relayed to the Nome office by radio.

The reported hourly counts for chum and sockeye salmon were combined for the purposes of this report because of difficulty distinguishing between these two species at the current tower site.

The expanded counts for this report were calculated using the following methods. The 18 hour counts for the days off were estimated by adding the counts of each hour of the day before to the counts of each hour of the day following and dividing the result by two, giving expanded hourly counts for the 18 hours of the day off. Next an expansion factor was calculated to compensate for the 6 hours not normally counted. This factor was derived from the weekly 24 hour count by dividing the total count from 0600 hours to 1200 hours during the 24 hour count by the total normal 18 hour count during the 24 hour count. Then each 18 hour count for the remaining days was expanded to 24 hour counts by applying the expansion factor to the three days before and after each 24 hour count by multiplying each days 18 hour total by the 24 hour expansion factor, and adding that number to the 18 hour count for each day. This expansion was done for all species counted.

The expanded counts for the hours or days missed were linearly interpolated as follows. For a day with the normal 18 hour count missed, the count for the missing day was calculated by adding the counts of each hour of the day before the missed period to the counts of each hour of the day following the missed period and dividing the result by two. If two or more days were missed the count for the missing days was calculated by adding the counts of each hour of the day before the missed period to the counts of each hour of the day following the missed period and dividing the result by two. Then each 18 hour count was expanded to a 24 hour count by multiplying each days 18 hour total by the nearest 24 hour expansion factor, and adding that number to the 18 hour count for each day.

RESULTS

Table 1 shows the expanded daily and cumulative totals for each species. The reported total hourly counts were: 11,118 combined chum and sockeye salmon, 2,744 pink salmon, 276 king salmon, and 240 coho salmon (Tables 6-9). The original reported hourly observations for chum and sockeye salmon are shown in Appendix Tables 1-2. The expanded counts were: 15,619 combined chum and sockeye salmon, 5,557 pink salmon, 356 king salmon, and 452 coho salmon (Tables 2-5).

Combined chum and sockeye salmon, and pink salmon were observed on 12 July, the first day of counting. King salmon were first observed on 14 July. Coho salmon were first observed on 25 July. The daily peak count of 1,425 combined chum and sockeye salmon occurred on 19 July; the daily peak count of 587 pink salmon occurred on 19 July; the daily peak count of 72 king salmon on 16 July; the daily peak count of 114 coho salmon occurred on 30 July (Table 1).

Most combined chum and sockeye salmon returned during the first three weeks of counting when 82% passed the tower (Table 2 and Figures 3 and 4). Most pink salmon returned during the first three weeks of counting when 88% passed the tower (Table 3 and Figures 5 and 6). Most king salmon returned during the first two weeks of counting when 95% passed the tower (Table 4 and Figures 7 and 8). Most coho salmon counted returned during the sixteen days from 25 July through 9 August when 96% passed the tower (Table 5 and Figures 9 and 10).

All species counted exhibited a diurnal pattern of migration past the counting tower. During the twelve hour period from 1800 through 0500 hours, 84% of the combined chum and sockeye salmon passed the tower (Table 2 and Figure 11). During the twelve hour period from 1800 through 0500 hours, 76% of the pink salmon passed the tower (Table 3 and Figure 12). During the two hour period from 2100 through 2200 hours, 36% of the king salmon passed the tower. During the four hour period from 0000 through 0300 hours, 39% of the king salmon passed the tower. There was no migration of king salmon during the hour beginning at 2300 hours and during the period from 0600 through 1100 hours (Table 4 and Figure 13). During the four hour period from 0000 through 0300 hours, 60% of the coho salmon passed the tower (Table 5 and Figure 14).

An aerial survey of Salmon Lake counted 8,760 sockeye salmon on 8 August, 1997. The total season expanded tower count of combined chum and sockeye salmon was 15,619 (Table 1).

An aerial survey of the Pilgrim River counted 587 king salmon on 21 July, 1997. The total season expanded tower count of king salmon was 356. The aerial survey counted 1.65 times the total season expanded tower count of king salmon. The aerial survey counted 587 king salmon above the counting tower on 21 July, when the cumulative tower count of king salmon was 237. The aerial survey counted 2.48 times the cumulative tower count on 21 July (Table 1).

An aerial survey of the Pilgrim River counted 500 coho salmon on 27 August, 1997. The total season expanded tower count of coho salmon was 452. The aerial survey counted 1.1 times the total season expanded tower count of coho salmon (Table 1).

DISCUSSION

This was the first year of operation for the Pilgrim River counting tower. Species identification, particularly for chum and sockeye salmon, was difficult at the tower site. For this report, the reported counts of chum and sockeye salmon were combined because of the identification problems. This difficulty is illustrated when the aerial survey count of 8,760 sockeye salmon in Salmon Lake on 8 August is compared to the observed tower count of 954 sockeye salmon for the entire counting season (Appendix Table 2). The

comparisons between tower counts and aerial surveys for king and coho salmon indicate that these species were undercounted at the tower site. In the future species identification and enumeration may be improved by relocating the tower and flash panel to shallower water and by improved crew skills.

The value of a counting tower on this watershed is evident. A five year cooperative project between ADF&G, Norton Sound Economic Development Corporation (NSEDC), and the Bureau of Land Management (BLM) began in 1997. A major component of this project is fertilizing Salmon Lake to ultimately increase the numbers of sockeye salmon returning to the Pilgrim River system. The counting tower could serve as a valuable evaluation tool for the success of this project. The counting tower could also provide valuable information for the management of fisheries in the Port Clarence District.

ACKNOWLEDGEMENTS

The ADF&G thanks Kawerak Corporation for operating this project and in particular the tower crew who operated the tower. A draft of this report was reviewed by Larry Buklis.

Table 2. Expanded daily hourly combined chum and sockeye salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul							Start of the counting season		0	40	54	0	2	14	190	132	46	102	112	692	0.8%	
13-Jul	64	60	4	0	6	4		33	200	0	6	8	2	68	64	108	42	0	0	669	2.3%	
14-Jul	0	48	17	4	0	8		27	6	70	32	0	100	0	142	0	0	0	10	540	4.0%	
15-Jul	0	36	30	58	102	17		25	0	0	0	0	0	0	52	4	0	16	68	496	0.1%	
16-Jul	4	54	64	30	114	17		27	0	0	2	-4	0	0	0	14	0	78	136	0	536	0.2%
17-Jul	0	6	86	142	126	26		44	0	0	1	-2	0	13	102	10	80	144	107	3	888	23.0%
18-Jul	10	36	55	71	66	35		50	0	0	0	0	0	26	204	6	160	210	78	6	1,012	1.1%
19-Jul	20	66	24	0	65	35		71	0	0	2	0	0	34	12	0	406	604	60	26	1,425	0.2%
20-Jul	52	118	58	34	65	35		39	0	0	0	0	0	34	20	2	34	212	78	781	0.0%	
21-Jul	28	78	56	47	65	35		27	0	0	0	0	0	52	78	42	28	0	0	10	546	2.0%
22-Jul	24	82	75	47	65	35		30	0	0	0	0	0	0	0	0	138	12	40	54	602	0.8%
23-Jul	26	78	94	60	65	35		24	0	0	0	0	0	6	4	2	0	0	0	90	484	7.2%
24-Jul	84	186	28	130	4	44		31	1	46	0	0	0	3	16	4	0	1	0	45	623	8.6%
25-Jul	42	94	60	72	51	31		23	1	46	0	0	0	0	28	6	0	2	0	0	456	0.9%
26-Jul	0	2	92	14	98	18		41	2	92	0	8	48	6	108	126	6	74	34	46	815	6.5%
27-Jul	0	6	10	30	10	56		6	0	0	0	0	0	0	0	0	0	0	0	0	118	0.0%
28-Jul	-8	4	20	132	22	6		12	0	0	0	0	14	-4	2	6	40	0	0	0	246	6.2%
29-Jul	24	40	0	8	0	0		9	6	0	0	0	0	24	0	-6	0	10	22	38	175	7.6%
30-Jul	48	76	112	96	56	0		40	0	2	0	62	108	98	42	12	4	18	18	12	804	3.7%
31-Jul	37	50	84	78	36	0		27	0	8	1	38	57	48	33	6	2	9	9	12	535	0.0%
1-Aug	37	50	84	78	36	0		21	0	14	2	14	6	48	24	0	0	0	0	12	428	4.2%
2-Aug	26	24	56	60	16	0		12	0	20	0	8	0	-2	8	4	0	12	0	0	244	5.4%
3-Aug	25	17	80	38	13	0		11	0	0	0	0	0	0	0	0	2	4	0	40	230	1.6%
4-Aug	24	10	53	50	13	0		10	6	0	0	4	0	0	0	0	1	2	0	20	193	3.3%
5-Aug	16	14	53	50	13	0		9	6	0	0	4	0	0	0	0	1	2	0	20	188	1.0%
6-Aug	16	14	53	50	13	0		9	6	0	0	4	0	0	0	0	1	2	0	20	188	1.4%
7-Aug	16	14	53	50	13	0		9	6	0	0	4	0	0	0	0	1	2	0	20	188	3.1%
8-Aug	16	14	53	50	13	0		8	6	0	0	8	0	0	0	0	0	0	0	0	168	1.1%
9-Aug	8	18	26	62	10	0		14	12	4	62	22	20	0	0	0	0	14	4	6	282	1.4%
10-Aug	0	12	0	88	66	-16		0	0	0	0	0	0	0	0	0	0	0	0	0	150	0.0%
11-Aug	18	28	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	46	0.0%
12-Aug	0	20	100	36	0	2		0	0	0	0	0	0	0	-1	11	0	0	0	0	168	0.4%
13-Aug	0	0	0	0	106	102		0	0	0	0	0	0	6	-2	22	0	0	0	0	234	0.2%
14-Aug	0	6	8	34	24	18		0	0	6	4	0	0	0	0	6	0	0	0	14	120	0.4%
15-Aug	88	16	19	17	12	9		0	0	3	0	0	2	0	-4	3	0	0	0	14	179	0.8%
16-Aug	4	48	30	0	12	9		0	0	0	0	0	0	0	0	0	0	0	0	0	103	0.1%
17-Aug	0	0	0	0	0	0		0	0	0	0	0	14	0	0	0	2	0	0	0	16	0.1%
18-Aug	0	8	0	0	0	0		0	0	0	0	0	6	0	-2	0	0	0	0	0	12	0.0%
19-Aug	0	0	0	0	9	2		0	0	0	0	0	0	-10	0	0	0	0	0	-2	0	0.0%
20-Aug	0	14	10	2	18	4		0	0	0	0	0	0	-4	0	0	-2	0	0	0	42	0.0%
21-Aug	0	0	0	0	0	0	End of counting season	0												0	0.0%	
Total =	749	1,447	1,647	1,718	1,402	567		689	258	311	152	232	377	414	958	596	1,044	1,298	900	860	15,619	
	4.8%	9.3%	10.5%	11.0%	9.0%	3.6%		4.4%	1.7%	2.0%	1.0%	1.5%	2.4%	2.7%	6.1%	3.8%	6.7%	8.3%	5.8%	5.5%	100.0%	

1. Expanded daily and cumulative salmon migration past the Pilgrim River fish counting tower, Port Clarence, 1997.

Date	Daily Chum &	Cumulative Chum &	Daily Pink	Cumulative	Daily King	Cumulative	Daily Coho	Cumulative
	Sockeye Combined	Sockeye Combined		Pink		King		Coho
12-Jul	692	692	110	110	0	0	0	0
13-Jul	669	1,361	132	242	0	0	0	0
14-Jul	540	1,901	184	426	53	53	0	0
15-Jul	496	2,397	258	684	8	61	0	0
16-Jul	536	2,933	266	950	72	133	0	0
17-Jul	888	3,821	306	1,256	40	173	0	0
18-Jul	1,012	4,833	261	1,517	36	209	0	0
19-Jul	1,425	6,258	587	2,104	24	233	0	0
20-Jul	781	7,039	288	2,392	0	233	0	0
21-Jul	546	7,585	288	2,680	4	237	0	0
22-Jul	602	8,187	261	2,941	8	245	0	0
23-Jul	484	8,671	222	3,163	20	265	0	0
24-Jul	623	9,294	247	3,410	47	312	0	0
25-Jul	456	9,750	154	3,564	25	337	6	6
26-Jul	815	10,565	198	3,762	2	339	12	18
27-Jul	118	10,683	47	3,809	4	343	49	67
28-Jul	246	10,929	61	3,870	4	347	15	82
29-Jul	175	11,104	76	3,946	0	347	10	92
30-Jul	804	11,908	392	4,338	4	351	114	206
31-Jul	535	12,443	284	4,622	3	354	59	265
1-Aug	426	12,869	244	4,866	2	356	42	307
2-Aug	244	13,113	123	4,989	2	358	2	309
3-Aug	230	13,343	60	5,049	1	359	4	313
4-Aug	193	13,536	62	5,111	0	359	16	329
5-Aug	188	13,724	45	5,156	0	359	17	346
6-Aug	188	13,912	45	5,201	0	359	17	363
7-Aug	188	14,100	45	5,246	0	359	17	380
8-Aug	168	14,268	44	5,290	-1	358	16	396
9-Aug	282	14,550	47	5,337	0	358	36	432
10-Aug	150	14,700	26	5,363	2	360	0	432
11-Aug	46	14,746	28	5,391	-2	358	0	432
12-Aug	168	14,914	5	5,396	3	361	6	438
13-Aug	234	15,148	26	5,422	0	361	0	438
14-Aug	120	15,268	20	5,442	0	361	0	438
15-Aug	179	15,447	93	5,535	-4	357	0	438
16-Aug	103	15,550	21	5,556	-1	356	0	438
17-Aug	16	15,566	4	5,560	0	356	14	452
18-Aug	12	15,578	6	5,566	0	356	0	452
19-Aug	-1	15,577	-9	5,557	0	356	0	452
20-Aug	42	15,619	0	5,557	0	356	0	452
21-Aug	0	15,619	0	5,557	0	356	0	452

T Expanded daily hourly pink salmon migration past the Pilgrim River countin , Port Clarence, 1997.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
12-Jul							Start of the counting season													110	0.8%		
13-Jul	60	2	2	0	0	0		24	20	0	2	0	0	0	18	4	0	0	0	0	132	2.3%	
14-Jul	0	1	3	0	0	0		34	6	64	8	0	12	2	8	0	0	0	18	28	184	4.0%	
15-Jul	0	0	4	8	6	60		47	0	0	0	0	0	0	8	0	0	8	38	80	258	0.1%	
16-Jul	4	8	24	32	10	59		49	0	0	0	0	0	0	0	4	2	36	38	0	266	0.2%	
17-Jul	0	0	2	34	32	118		56	0	0	0	0	0	0	5	2	5	23	28	1	306	23.0%	
18-Jul	10	0	26	28	44	59		46	0	0	0	0	0	0	10	0	8	10	18	2	261	1.1%	
19-Jul	20	0	50	18	44	59		108	0	0	0	0	0	0	0	0	0	92	166	24	587	0.2%	
20-Jul	52	0	0	14	44	59		53	0	0	0	0	0	0	2	0	6	26	8	24	288	0.0%	
21-Jul	28	8	16	18	44	59		53	0	0	0	0	0	0	18	22	14	2	0	0	6	288	2.0%
22-Jul	22	22	24	18	44	59		48	0	0	0	0	0	0	0	0	0	12	4	0	8	261	0.8%
23-Jul	24	0	32	22	44	59		41	0	0	0	0	0	0	0	0	0	0	0	0	222	7.2%	
24-Jul	66	16	44	16	56	0		45	0	1	0	0	0	0	0	0	0	0	0	3	247	8.6%	
25-Jul	33	8	25	15	29	9		28	0	1	0	0	0	0	0	0	0	0	0	6	154	0.9%	
26-Jul	0	0	6	14	2	18		36	0	2	0	6	6	0	32	38	0	28	4	6	198	6.5%	
27-Jul	0	0	18	6	10	4		9	0	0	0	0	0	0	0	0	0	0	0	0	47	0.0%	
28-Jul	-8	2	12	4	20	8		11	0	2	2	0	4	0	2	2	0	0	0	0	61	6.2%	
29-Jul	18	14	2	0	0	0		14	0	0	0	2	0	2	0	6	2	2	0	14	76	7.6%	
30-Jul	48	16	40	62	12	0		72	0	2	0	24	32	22	2	6	24	12	10	8	392	3.7%	
31-Jul	37	11	30	42	14	0		52	0	6	6	15	16	11	7	4	12	6	5	10	284	0.0%	
1-Aug	37	11	30	42	14	0		45	0	10	12	6	0	11	12	2	0	0	0	12	244	4.2%	
2-Aug	26	6	20	22	16	0		23	0	8	0	2	0	0	0	0	0	0	0	0	123	5.4%	
3-Aug	25	9	0	-2	8	1		11	0	0	0	0	0	0	0	0	0	2	0	6	60	1.6%	
4-Aug	24	12	0	-1	8	1		11	0	0	0	2	0	0	0	0	0	0	2	0	62	3.3%	
5-Aug	16	6	0	-1	8	1		8	0	0	0	2	0	0	0	0	0	2	0	3	45	1.0%	
6-Aug	16	6	0	-1	8	1		8	0	0	0	2	0	0	0	0	0	2	0	3	45	1.4%	
7-Aug	16	6	0	-1	8	1		8	0	0	0	2	0	0	0	0	0	2	0	3	45	3.1%	
8-Aug	16	6	0	-1	8	1		8	0	0	0	4	0	0	0	0	0	2	0	0	44	1.1%	
9-Aug	8	0	0	0	0	2		9	0	0	12	2	8	4	0	0	0	2	0	0	47	1.4%	
10-Aug	0	0	0	0	18	8		0	0	0	0	0	0	0	0	0	0	0	0	0	26	0.0%	
11-Aug	18	0	10	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	28	0.0%	
12-Aug	0	0	0	2	0	0		0	0	0	0	0	0	0	1	0	0	0	2	0	5	0.4%	
13-Aug	0	6	0	0	14	4		0	0	0	0	0	0	2	0	0	0	0	0	0	26	0.2%	
14-Aug	0	2	0	0	0	18		0	0	0	-2	0	0	0	0	0	0	2	0	0	20	0.4%	
15-Aug	72	12	3	1	0	9		0	0	0	0	0	-2	0	0	0	0	0	0	-2	93	0.8%	
16-Aug	4	0	6	2	0	9		0	0	0	0	0	0	0	0	0	0	0	0	0	21	0.1%	
17-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	2	2	0	0	0	4	0.1%	
18-Aug	0	0	0	0	0	0		0	4	0	0	2	0	0	0	0	0	0	0	0	6	0.0%	
19-Aug	0	-2	-4	0	-1	0		0	0	0	0	0	0	0	0	0	0	0	0	-2	-9	0.0%	
20-Aug	0	0	2	0	-2	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Aug	0	0	0	0	0	0	0	0	End of counting season											0	0.0%		
Total =	692	188	427	411	562	685		959	30	96	40	79	76	72	131	156	183	345	197	228	5,557		
	12.5%	3.4%	7.7%	7.4%	10.1%	12.3%		17.3%	0.5%	1.7%	0.7%	1.4%	1.4%	1.3%	2.4%	2.8%	3.3%	6.2%	3.5%	4.1%	100.0%		

Table 4. Expanded daily hourly king salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul																				0	0.8%	
13-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	
14-Jul	0	0	1	0	0	0		0	0	0	0	0	8	0	44	0	0	0	0	0	53	4.0%
15-Jul	0	0	2	0	2	0		0	0	0	0	0	0	0	0	0	0	4	0	0	8	0.1%
16-Jul	6	4	10	4	0	0		0	0	0	2	0	0	0	0	0	0	14	32	0	72	0.2%
17-Jul	0	0	0	0	0	0		0	0	0	2	0	0	0	0	0	3	14	21	0	40	23.0%
18-Jul	0	2	2	0	0	0		0	0	0	2	0	0	0	0	0	6	14	10	0	36	1.1%
19-Jul	0	4	4	0	0	0		0	0	0	0	0	0	0	0	0	0	16	0	0	24	0.2%
20-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
21-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	4	0	0	0	0	4	2.0%
22-Jul	0	0	8	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	8	0.8%
23-Jul	4	0	16	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	20	7.2%
24-Jul	8	12	0	26	0	0		0	0	0	0	0	0	0	0	1	0	0	0	0	47	8.8%
25-Jul	4	6	0	13	0	0		0	0	0	0	0	0	0	0	2	0	0	0	0	25	0.9%
26-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	2	0	0	2	6.5%
27-Jul	0	0	0	0	4	0		0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.0%
28-Jul	0	0	0	0	0	2		0	0	0	0	0	0	2	0	0	0	0	0	0	4	6.2%
29-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.6%
30-Jul	0	0	2	0	0	0		0	0	0	0	0	0	0	0	0	0	0	2	0	4	3.7%
31-Jul	0	1	1	0	0	0		0	0	0	0	0	0	0	0	0	0	1	0	0	3	0.0%
1-Aug	0	1	1	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2	4.2%
2-Aug	0	2	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2	5.4%
3-Aug	0	1	0	-2	0	0		0	0	2	0	0	0	0	0	0	0	0	0	0	1	1.6%
4-Aug	0	0	0	-1	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0	0	3.3%
5-Aug	0	0	0	-1	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.0%
6-Aug	0	0	0	-1	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0	0	1.4%
7-Aug	0	0	0	-1	0	0		0	0	1	0	0	0	0	0	0	0	0	0	0	0	3.1%
8-Aug	0	0	0	-1	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	-1	1.1%
9-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.4%
10-Aug	0	0	0	2	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.0%
11-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	-2	0	0	0	0	0	-2	0.0%
12-Aug	0	2	0	0	0	0		0	0	0	0	0	2	0	-1	0	0	0	0	0	3	0.4%
13-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%
14-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%
15-Aug	-2	0	0	0	0	0		0	0	0	0	0	0	-2	0	0	0	0	0	0	-4	0.8%
16-Aug	0	0	0	0	0	0		0	0	0	0	0	0	-1	0	0	0	0	0	0	-1	0.1%
17-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
18-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
19-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
20-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
21-Aug	0	0	0	0	0	0		0	End of counting season											0	0.0%	
Total =	20	35	47	38	6	2		0	0	6	6	0	10	-1	41	7	9	64	66	0	356	
	5.6%	9.8%	13.2%	10.7%	1.7%	0.6%		0.0%	0.0%	1.7%	1.7%	0.0%	2.8%	-0.3%	11.5%	2.0%	2.5%	18.0%	18.5%	0.0%	100.0%	

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Expanded daily hourly coho salmon migration past the Pilgrim River counting

Port Clarence, 1997.

Shaded areas indicate hours not counted. Numbers in shaded areas indicate estimated passage.

Date	0000	0100	0200	0300	0400	0500	0600-1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul																				0	0.8%	
13-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
14-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	4.0%	
15-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%	
16-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
17-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	23.0%	
18-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	1.1%	
19-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%	
20-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2.0%	
22-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%	
23-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	7.2%	
24-Jul	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	8.6%	
25-Jul	0	0	3	2	0	0		1	0	0	0	0	0	0	0	0	0	0	0	0	0.9%	
26-Jul	0	0	6	4	0	0		2	0	0	0	0	0	0	0	0	0	0	0	0	6.5%	
27-Jul	0	14	0	18	6	2		9	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
28-Jul	0	0	2	0	0	4		3	0	0	0	0	0	0	2	0	4	0	0	0	6.2%	
29-Jul	0	0	0	0	0	0		2	0	0	0	0	0	0	0	0	0	4	4	10	7.6%	
30-Jul	20	12	28	4	0	0		20	0	0	0	0	0	0	20	0	0	10	0	0	114	3.7%
31-Jul	10	7	14	2	0	0		10	0	0	0	1	0	0	10	0	0	5	0	0	59	0.0%
1-Aug	10	7	14	2	0	0		7	0	0	0	2	0	0	0	0	0	0	0	0	42	4.2%
2-Aug	0	2	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	2	5.4%
3-Aug	0	1	0	0	0	0		1	0	2	0	0	0	0	0	0	0	0	0	0	4	1.6%
4-Aug	0	0	4	7	0	0		3	1	1	0	0	0	0	0	0	0	0	0	0	16	3.3%
5-Aug	0	1	4	7	0	0		3	1	1	0	0	0	0	0	0	0	0	0	0	17	1.0%
6-Aug	0	1	4	7	0	0		3	1	1	0	0	0	0	0	0	0	0	0	0	17	1.4%
7-Aug	0	1	4	7	0	0		3	1	1	0	0	0	0	0	0	0	0	0	0	17	3.1%
8-Aug	0	1	4	7	0	0		3	1	0	0	0	0	0	0	0	0	0	0	0	16	1.1%
9-Aug	0	2	8	14	0	0		6	2	0	0	2	0	2	0	0	0	0	0	0	36	1.4%
10-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
11-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
12-Aug	0	0	2	4	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	6	0.4%
13-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2%
14-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.4%
15-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8%
16-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1%
17-Aug	0	0	0	0	0	0		0	0	0	8	6	0	0	0	0	0	0	0	0	14	0.1%
18-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
19-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
20-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
21-Aug	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
Total =	40	49	97	85	6	6		76	7	6	8	11	0	2	32	0	4	15	4	452		
	8.8%	10.8%	21.5%	18.8%	1.3%	1.3%		16.8%	1.5%	1.3%	1.8%	2.4%	0.0%	0.4%	7.1%	0.0%	0.9%	3.3%	0.9%	0.9%	100.0%	

Table 6. Reported hourly combined chum and sockeye salmon observations at the Pilgrim River counting tower, Port Clarence, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
12-Jul																										692	6.2%	
13-Jul	64	60	4	0	6									200	0	5	8	2	68	64	108	42	0	0	0	632	5.7%	
14-Jul	0			4	0	8	0						6	70	32	0	100	0	142	0	0	0	10	78	448	4.0%		
15-Jul	0	36	30	58	102								0	0	0	0	0	0	52	4	0	16	68	88	454	4.1%		
16-Jul	4	54	64	30	114								0	0	2	-4	0	0	0	14	0	78	136	0	492	4.4%		
17-Jul	0	6	86	142	126	26	0	2	0	0														388	3.5%			
18-Jul														0	0	0	0	0	26	204	6	160	210	78	6	690	6.2%	
19-Jul	20	66	24	0										0	0	2	0	0	0	34	12	0	406	604	60	26	1,254	11.3%
20-Jul	52	118	58	34									0	0	0	0	0	0	34	20	2	34	212	78	642	5.8%		
21-Jul	28	78	56										0	0	0	0	0	0	52	78	42	28	0	0	10	372	3.3%	
22-Jul	24	82											0	0	0	0	0	0	0	0	0	138	12	40	54	350	3.1%	
23-Jul	26	78	94	60									0	0	0	0	0	0	6	4	2	0	0	0	90	360	3.2%	
24-Jul	84	186	28	130	4	44	0	0	0																476	4.3%		
25-Jul																			0	0	0	0	0	0	36	0.3%		
26-Jul	0	2	92	14	98	18							2	92	0	8	48	6	108	126	6	74	34	46	774	7.0%		
27-Jul	0	6	10	30	10	56							0	0	0	0	0	0	0	0	0	0	0	0	112	1.0%		
28-Jul	-8	4	20	132	22	6							0	0	0	0	14	-4	2	6	40	0	0	0	234	2.1%		
29-Jul	24	40	0	8	0	0							6	0	0	0	0	24	0	-6	0	10	22	38	166	1.5%		
30-Jul	48	76	112	96	56	0	22	0	6	0	2	10	0	0	2	0	62	108	98	42	12	4	18	18	12	804	7.2%	
31-Jul																								0	0.0%			
1-Aug													0	14	2	14	6		24	0	0	0	0	12	72	0.6%		
2-Aug	26	24	56	60	16	0							0	20	0	8	0	-2	8	4	0	12	0	0	232	2.1%		
3-Aug			80	38									0	0	0	0	0	0	0	0	2	4	0	40	164	1.5%		
4-Aug	24	10																						34	0.3%			
5-Aug																								0	0.0%			
6-Aug																								0	0.0%			
7-Aug																								0	0.0%			
8-Aug																		0	0	8	0	0	0	0	0	0.1%		
9-Aug	8	18	26	62	10	0							12	4	62	22	20	0	0	0	0	14	4	6	268	2.4%		
10-Aug	0	12	0	88	66	-18							0	0	0	0	0	0	0	0	0	0	0	0	150	1.3%		
11-Aug	18	28	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	46	0.4%		
12-Aug	0	20	100	36	0	2							0	0	0	0	0	0	0	0	0	0	0	0	158	1.4%		
13-Aug	0	0	0	0	106	102							0	0	0	0	0	6	-2	22	0	0	0	0	234	2.1%		
14-Aug	0	6	8	34	24	18							0	6	4	0	0	0	0	6	0	0	0	14	120	1.1%		
15-Aug	88	16											0	0	0	0	2	0	-4					0	116	1.0%		
16-Aug	4	48	30	0									0	0	0	0	0	0	0	0	0	0	0	0	82	0.7%		
17-Aug	0	0	0	0	0	0							0	0	0	0	14	0	0	0	0	2	0	0	16	0.1%		
18-Aug	0	8	0	0	0	0							0	0	0	0	6	0	-2	0	0	0	0	0	12	0.1%		
19-Aug	0	0	0	0	0								0	0	0	0	0	-10	0	0	0	0	0	-2	-12	-0.1%		
20-Aug	0	14	10	2	18	4	0	0	0	0	0	0	0	0	0	0	-4	0	0	-2	0	0	0	42	0.4%			
21-Aug	0	0	0	0	0	0							0	End of counting season											0	0.0%		
Total	534	1,096	988	1,058	778	268	22	2	6	0	2	10	226	208	150	180	320	302	808	562	958	1,136	784	720	11,118			
	4.8%	9.9%	8.9%	9.5%	7.0%	2.4%	0.2%	0.0%	0.1%	0.0%	0.0%	0.1%	2.0%	1.9%	1.3%	1.6%	2.9%	2.7%	7.3%	5.1%	8.6%	10.2%	7.1%	6.5%	100.0%			

Table 7. Total hourly pink salmon observations at the Pilgrim River counting tower, Portage la Prairie, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul																										110	4.0%
13-Jul	2	2	0	0	0									20	0	2	0	0	0	18	4	0	0	0	0	48	1.7%
14-Jul	0			0	0	0	0						6	64	8	0	12	2	8	0	0	0	0	18	28	5.3%	
15-Jul	0	4	8	6	10								0	0	0	0	0	0	8	0	0	8	38	80	162	5.9%	
16-Jul	8	24	32	10	48								0	0	0	0	0	0	0	4	2	36	38	0	202	7.4%	
17-Jul	0	2	34	32	118	22	0	0	0	0														208	7.6%		
18-Jul														0	0	0	0	0	0	10	0	8	10	18	2	48	1.7%
19-Jul	0	50	18	0									0	0	0	0	0	0	0	0	92	166	24	6	356	13.0%	
20-Jul	0	0	14	44									0	0	0	0	0	0	2	0	6	26	8	24	124	4.5%	
21-Jul	8	16	12										0	0	0	0	0	0	18	22	14	2	0	0	6	98	3.6%
22-Jul	22	0											0	0	0	0	0	0	0	0	0	12	4	0	8	46	1.7%
23-Jul	0	32	22	18									0	0	0	0	0	0	0	0	0	0	0	0	0	72	2.6%
24-Jul	16	44	16	56	0	4	0	0	0																186	5.0%	
25-Jul																				0	0	0	0	0	0	6	0.2%
26-Jul	0	6	14	2	18	4							0	2	0	6	6	0	32	38	0	28	4	6	166	6.0%	
27-Jul	0	18	6	10	4	14							0	0	0	0	0	0	0	0	0	0	0	0	52	1.9%	
28-Jul	2	12	4	20	8	8							0	2	2	0	4	0	2	2	0	0	0	0	66	2.4%	
29-Jul	14	2	0	0	0	0							0	0	0	2	0	2	0	6	2	2	0	14	44	1.6%	
30-Jul	16	40	62	12	0	0	48	4	18	0	2	0	0	2	0	24	32	22	2	6	24	12	10	8	344	12.5%	
31-Jul																								0	0.0%		
1-Aug													0	10	12	6	0	12	2	0	0	0	0	0	12	54	2.0%
2-Aug	6	20	22	16	0	0							0	8	0	2	0	0	0	0	0	0	0	0	74	2.7%	
3-Aug		-2	10										0	0	0	0	0	0	0	0	0	0	2	0	8	16	0.6%
4-Aug	12	2																							14	0.5%	
5-Aug																								0	0.0%		
6-Aug																								0	0.0%		
7-Aug																								0	0.0%		
8-Aug													0	0	4	0	0	0	0	0	2	0	0	0	6	0.2%	
9-Aug	0	0	0	0	2	0							0	0	12	2	8	4	0	0	0	2	0	0	30	1.1%	
10-Aug	0	0	0	18	8	-6							0	0	0	0	0	0	0	0	0	0	0	0	20	0.7%	
11-Aug	0	10	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	10	0.4%	
12-Aug	0	0	2	0	0	0							0	0	0	0	0	0	0	0	0	2	0	4	0.1%		
13-Aug	6	0	0	14	4	18							0	0	0	0	0	2	0	0	0	0	0	0	44	1.6%	
14-Aug	2	0	0	0	18	0							0	0	-2	0	0	0	0	0	0	0	0	0	20	0.7%	
15-Aug	12	0											0	0	0	-2	0	0	0	0	0	0	0	0	8	0.3%	
16-Aug	0	6	2	0									0	0	0	0	0	0	0	0	0	0	0	0	8	0.3%	
17-Aug	0	0	0	0	0	0							0	0	0	0	0	0	0	0	2	2	0	0	4	0.1%	
18-Aug	0	0	0	0	0	0							4	0	0	2	0	0	0	0	0	0	0	0	6	0.2%	
19-Aug	-2	-4	0	0									0	0	0	0	0	0	0	0	0	0	0	-2	-8	-0.3%	
20-Aug	0	2	0	-2	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Aug	0	0	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
													0	End of counting season													
Total	124	288	266	266	238	64	48	4	18	0	2	0	30	88	34	56	60	50	116	150	166	308	164	202	2,744		
	4.5%	10.5%	9.7%	9.7%	8.7%	2.3%	1.7%	0.1%	0.7%	0.0%	0.1%	0.0%	1.1%	3.2%	1.2%	2.0%	2.2%	1.8%	4.3%	5.5%	6.0%	11.2%	6.0%	7.4%	100.0%		

Table 8. Reported hourly king salmon observations at the Pilgrim River counting tower, Port Clarence, 1997

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total			
12-Jul															0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
13-Jul	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
14-Jul	0			0	0	0	0	0							0	0	0	0	8	0	44	0	0	0	0	52	18.8%		
15-Jul	0	0	2	0	0	2									0	0	0	0	0	0	0	0	4	0	0	8	2.9%		
16-Jul	6	4	10	4	0										0	0	2	0	0	0	0	0	0	14	32	0	72	26.1%	
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0												0	0.0%			
18-Jul															0	0	2	0	0	0	0	0	6	14	10	0	32	11.6%	
19-Jul	0	4	4	0											0	0	0	0	0	0	0	0	0	16	0	0	24	8.7%	
20-Jul	0	0	0	0											0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul	0	0	0												0	0	0	0	0	0	0	4	0	0	0	4	1.4%		
22-Jul	0	0													0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
23-Jul	4	0	18	0											0	0	0	0	0	0	0	0	0	0	0	0	20	7.2%	
24-Jul	8	12	0	26	0	0	0	0	0	0															46	16.7%			
25-Jul																									2	0.7%			
26-Jul	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	2	0.7%	
27-Jul	0	0	0	0	4	0									0	0	0	0	0	0	0	0	0	0	0	0	4	1.4%	
28-Jul	0	0	0	0	0	2									0	0	0	0	0	2	0	0	0	0	0	0	4	1.4%	
29-Jul	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
30-Jul	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	4	1.4%			
31-Jul																									0	0.0%			
1-Aug															0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
2-Aug	0	2	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	2	0.7%	
3-Aug				0	-2										0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
4-Aug	0	0																							0	0.0%			
5-Aug																									0	0.0%			
6-Aug																									0	0.0%			
7-Aug																									0	0.0%			
8-Aug															0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
9-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
10-Aug	0	0	0	2	0	0									0	0	0	0	0	0	0	0	0	0	0	0	2	0.7%	
11-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	-2	-0.7%	
12-Aug	0	2	0	0	0	0									0	0	0	0	2	0						0	0	4	1.4%
13-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
14-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
15-Aug	-2	0													0	0	0	0	-2	0						0	0	-4	-1.4%
16-Aug	0	0	0	0											0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
18-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
19-Aug	0	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
20-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Aug	0	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
Total	16	24	34	30	6	2	0	0	0	0	0	0	0	0	2	4	0	10	0	42	6	6	50	44	0	276			
	5.8%	8.7%	12.3%	10.9%	2.2%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	1.4%	0.0%	3.6%	0.0%	15.2%	2.2%	2.2%	18.1%	15.9%	0.0%	100.0%			

Table 9 ted hourly coho salmon observations at the Pilgrim River counting tower, Portage, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul														0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%
13-Jul	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
14-Jul	0			0	0	0	0	0	0					0	0	0	0	0	0	0	0	0	0	0	0.0%		
15-Jul	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
16-Jul	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
18-Jul														0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
19-Jul	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
20-Jul	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
21-Jul	0	0	0											0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
22-Jul	0	0												0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
23-Jul	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
24-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
25-Jul															0	0	0	0	0	0	0	0	0	0	0	0	0.0%
26-Jul	0	0	6	4	0	0								0	0	0	0	0	0	0	0	0	0	0	10	4.2%	
27-Jul	0	14	0	18	6	2								0	0	0	0	0	0	0	0	0	0	0	40	16.7%	
28-Jul	0	0	2	0	0	4								0	0	0	0	0	2	0	4	0	0	0	12	5.0%	
29-Jul	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	8	3.3%	
30-Jul	20	12	28	4	0	0	18	0	2	0	0	0	0	0	0	0	0	0	20	0	0	10	0	0	114	47.5%	
31-Jul																								0	0.0%		
1-Aug														0	0	0	2	0	0	0	0	0	0	0	2	0.8%	
2-Aug	0	2	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	2	0.8%	
3-Aug		0	0											0	2	0	0	0	0	0	0	0	0	0	0	2	0.8%
4-Aug	0	0																						0	0.0%		
5-Aug																								0	0.0%		
6-Aug																								0	0.0%		
7-Aug																								0	0.0%		
8-Aug														0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
9-Aug	0	2	8	14	0	0								2	0	0	2	0	2	0	0	0	0	0	30	12.5%	
10-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
11-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
12-Aug	0	0	2	4	0	0								0	0	0	0	0	0	0	0	0	0	0	6	2.5%	
13-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
14-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
15-Aug	0	0												0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
16-Aug	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Aug	0	0	0	0	0	0								0	0	8	6	0	0	0	0	0	0	0	14	5.8%	
18-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
19-Aug	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
20-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
21-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
Total	20	30	46	44	6	6	18	0	2	0	0	0	0	2	2	8	10	0	2	22	0	4	10	4	240		
	8.3%	12.5%	19.2%	18.3%	2.5%	2.5%	7.5%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	3.3%	4.2%	0.0%	0.8%	9.2%	0.0%	1.7%	4.2%	1.7%	1.7%	100.0%	
Total	40	60	92	88	12	12	36	0	4	0	0	0	0	4	4	16	20	0	4	44	0	8	20	8	8	481	
	8.3%	12.5%	19.1%	18.3%	2.5%	2.5%	7.5%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	3.3%	4.2%	0.0%	0.8%	9.1%	0.0%	1.7%	4.2%	1.7%	1.7%	100.0%	

Figure 1. Area location map of the Pilgrim River counting tower project site. Port Clarence, 1997.

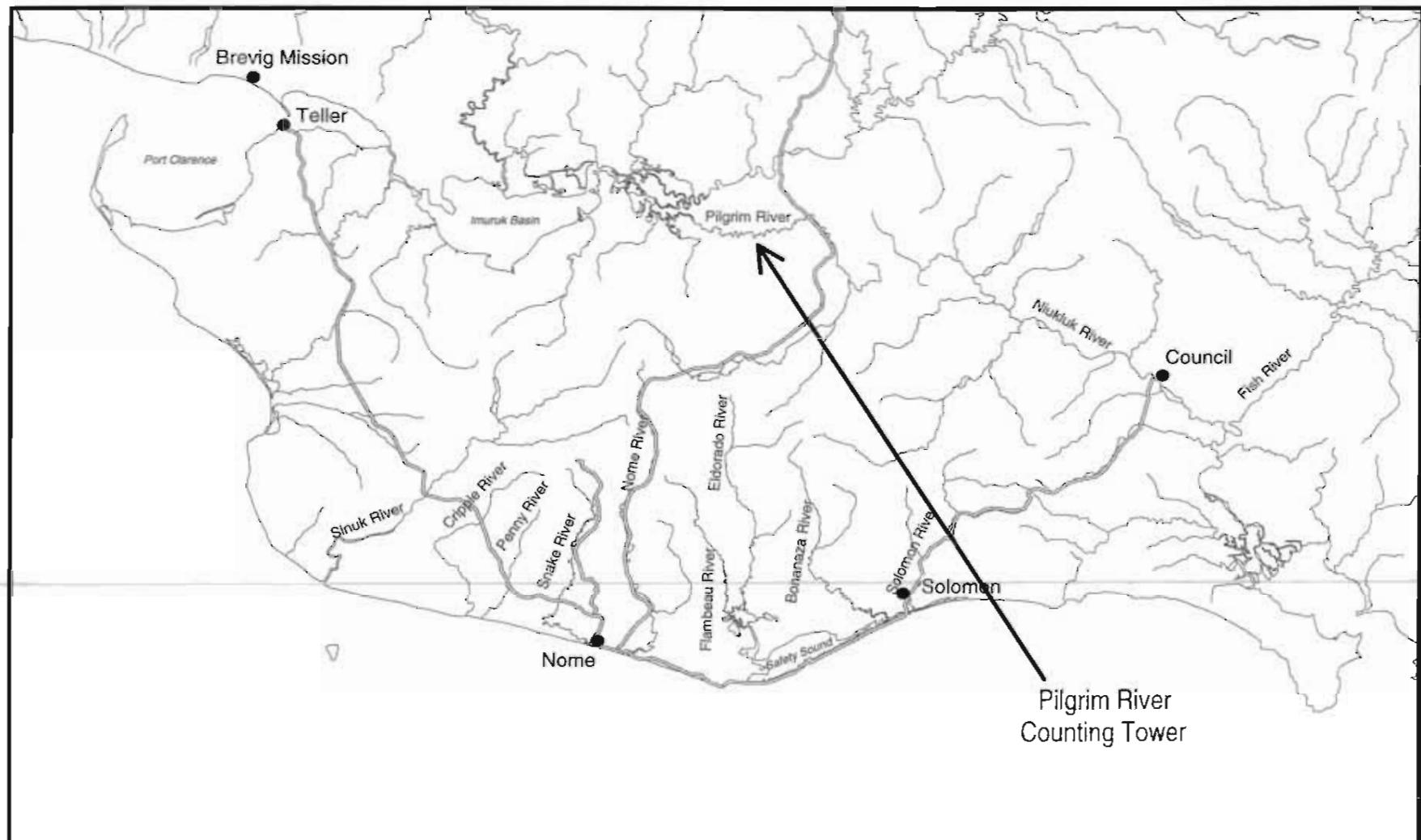


Figure 2. Cumulative migration of all species past the Pilgrim River counting tower, Port Clarence, 1997.

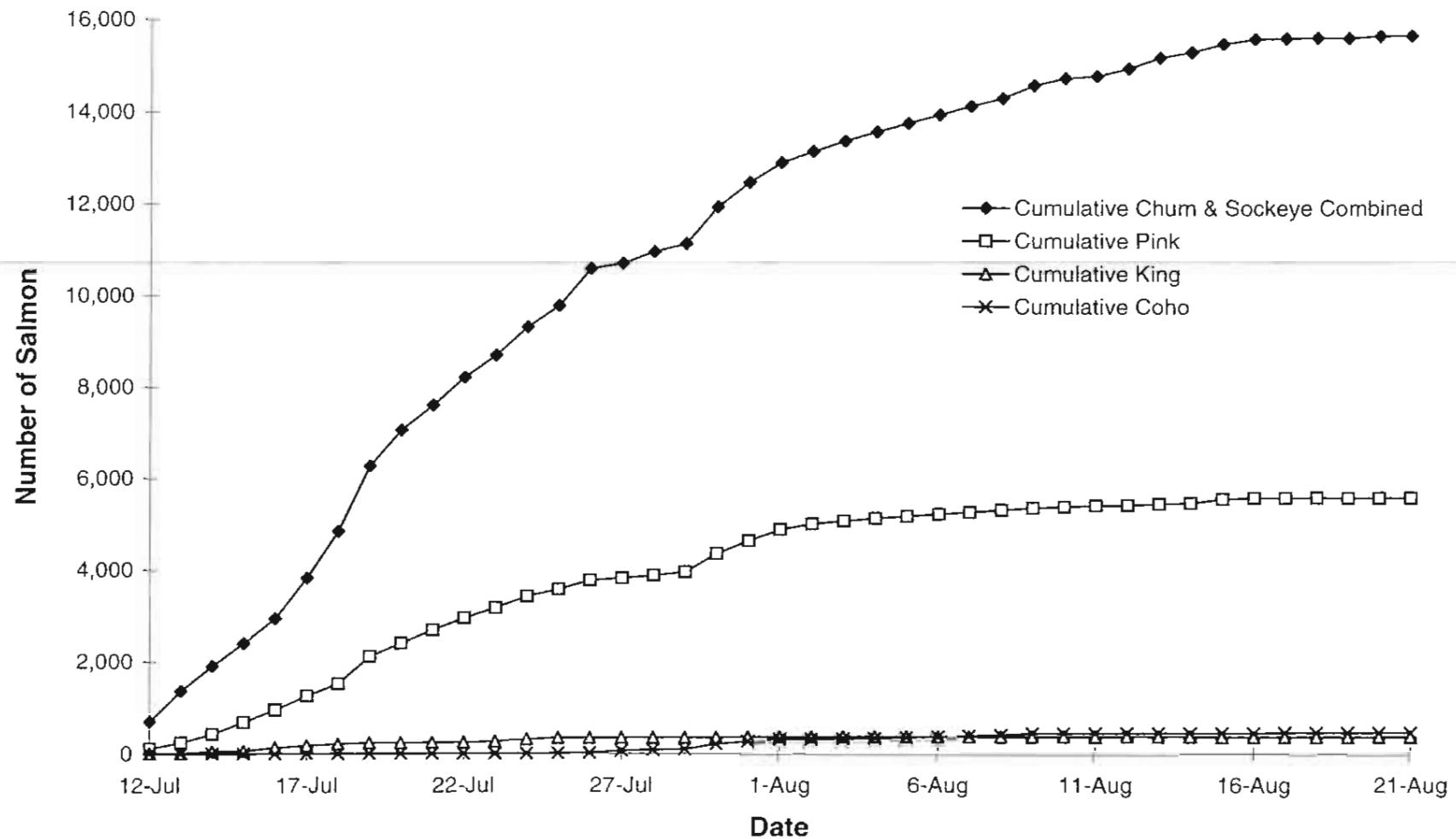


Figure 3. Daily combined chum and sockeye salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

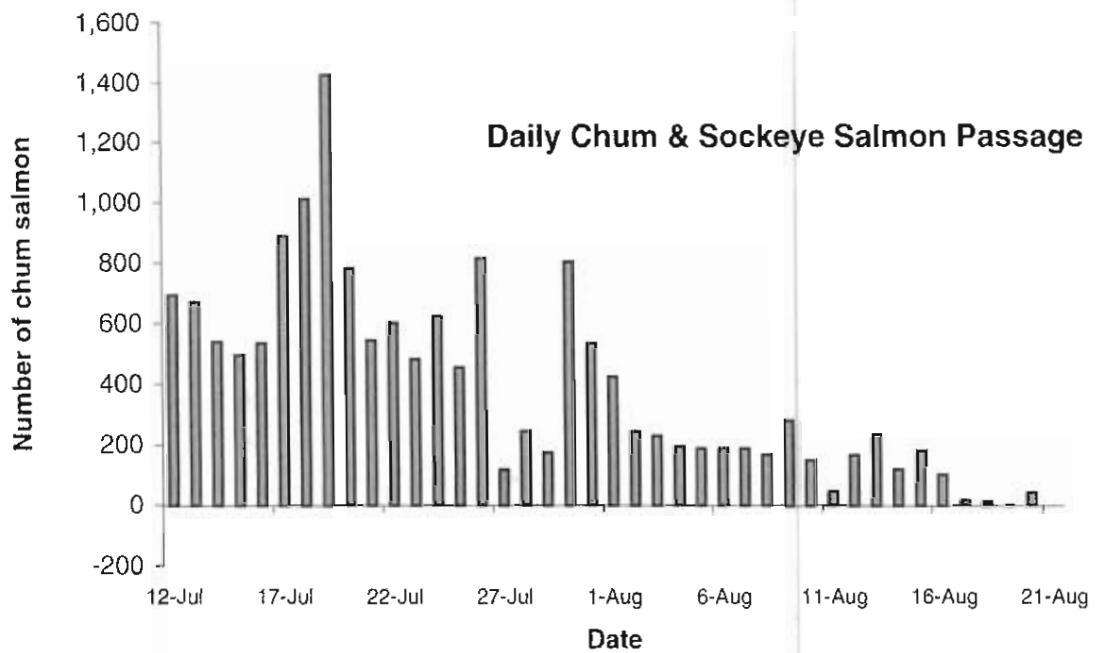


Figure 4. Cumulative combined chum and sockeye salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

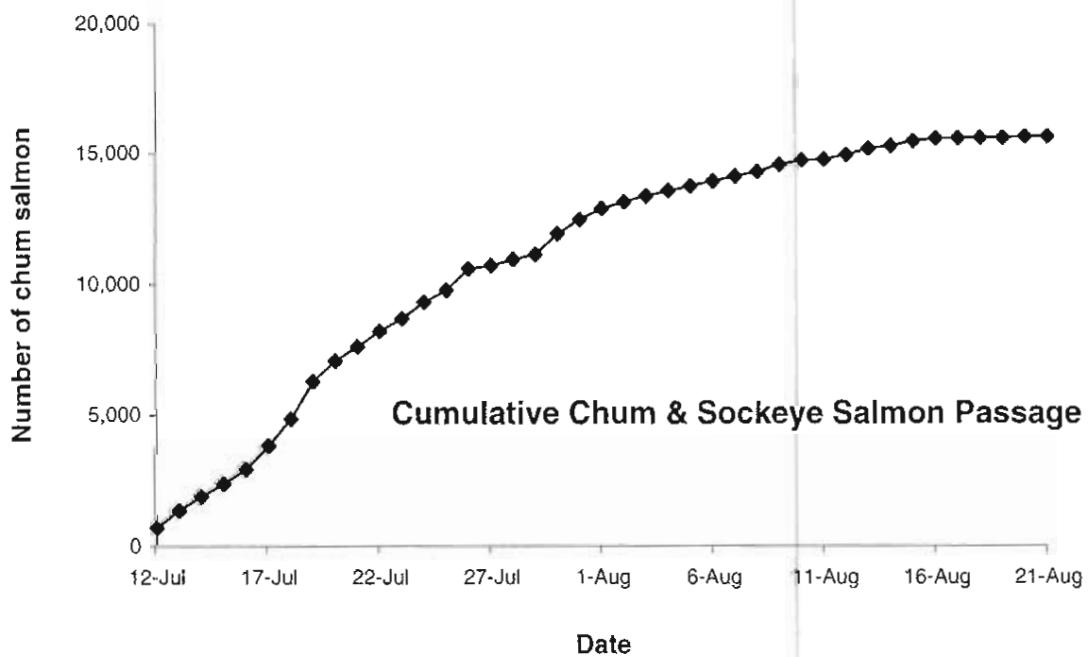


Figure 5. Daily pink salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

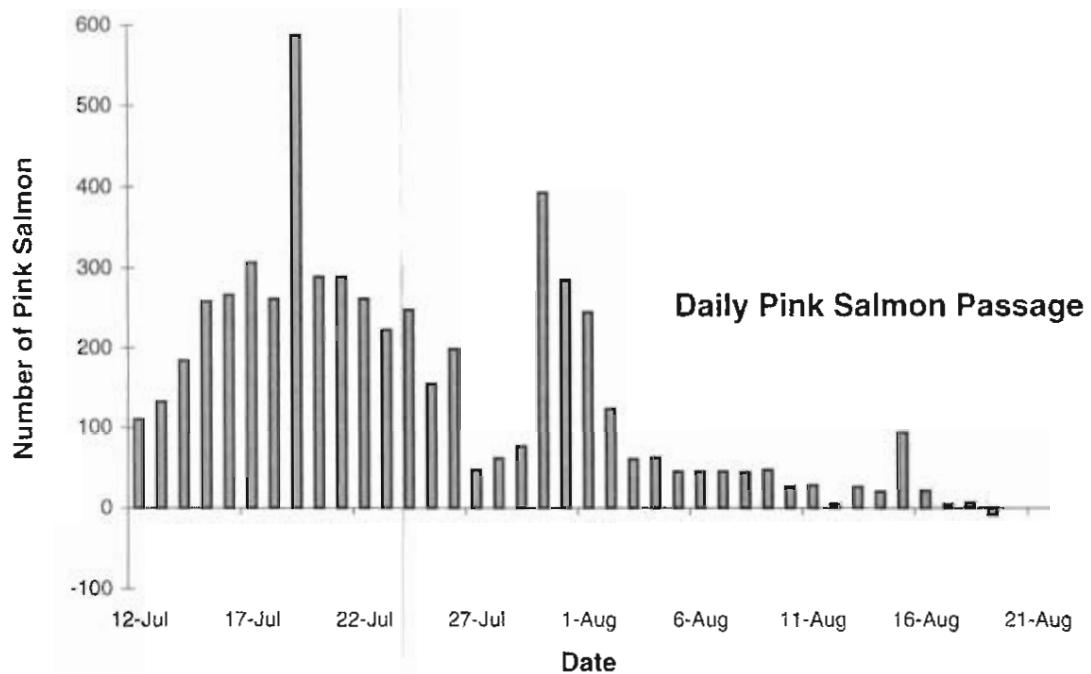


Figure 6. Cumulative pink salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

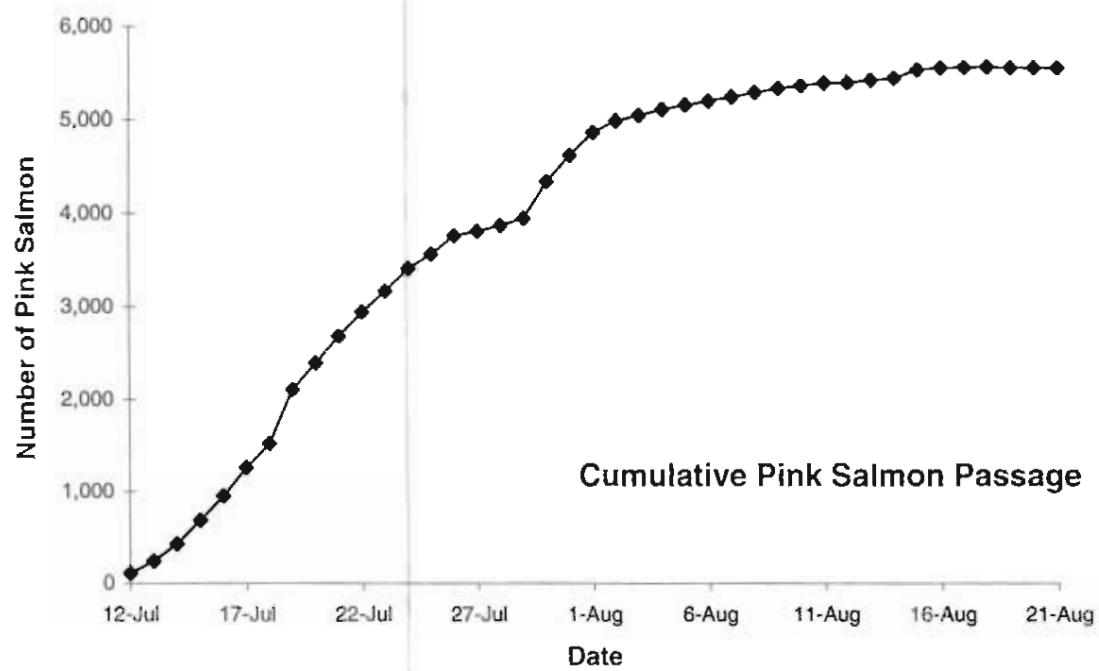


Figure 7. Daily king salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

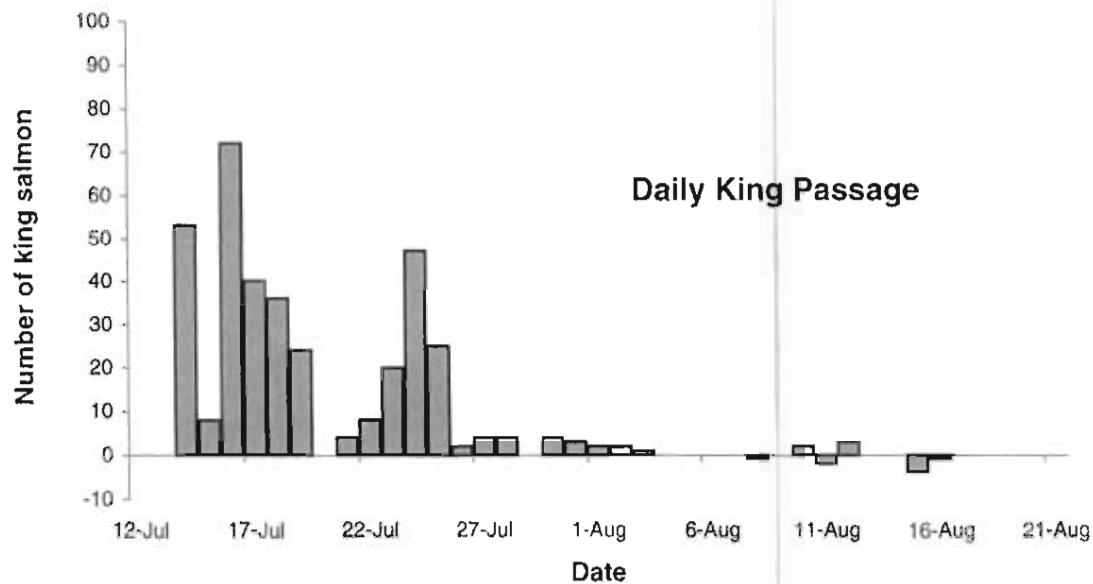


Figure 8. Cumulative king salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

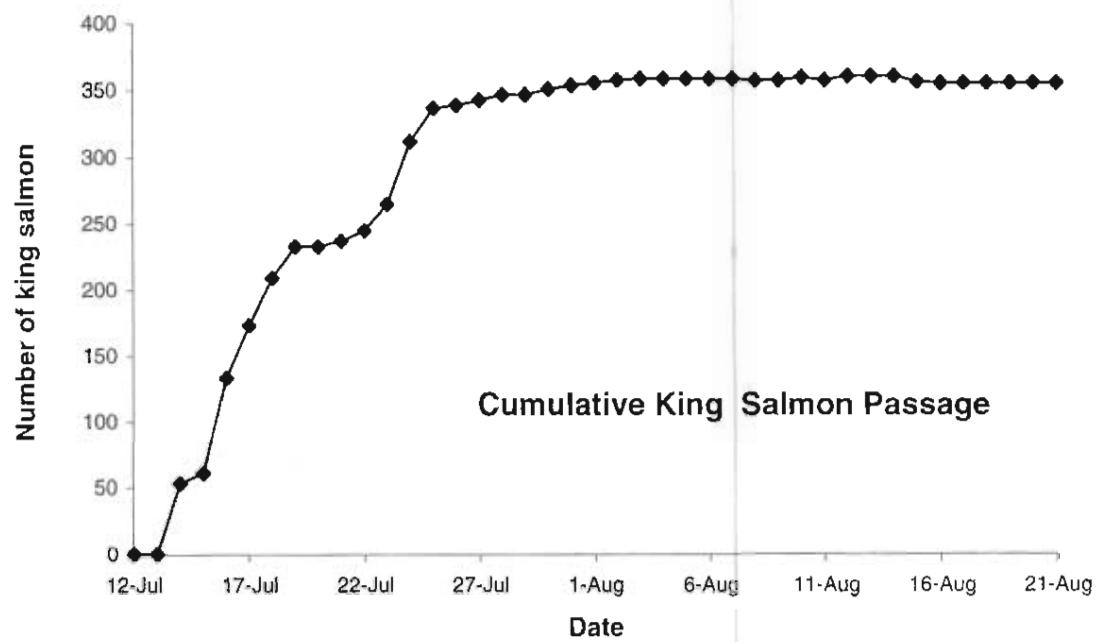


Figure 9. Daily coho salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

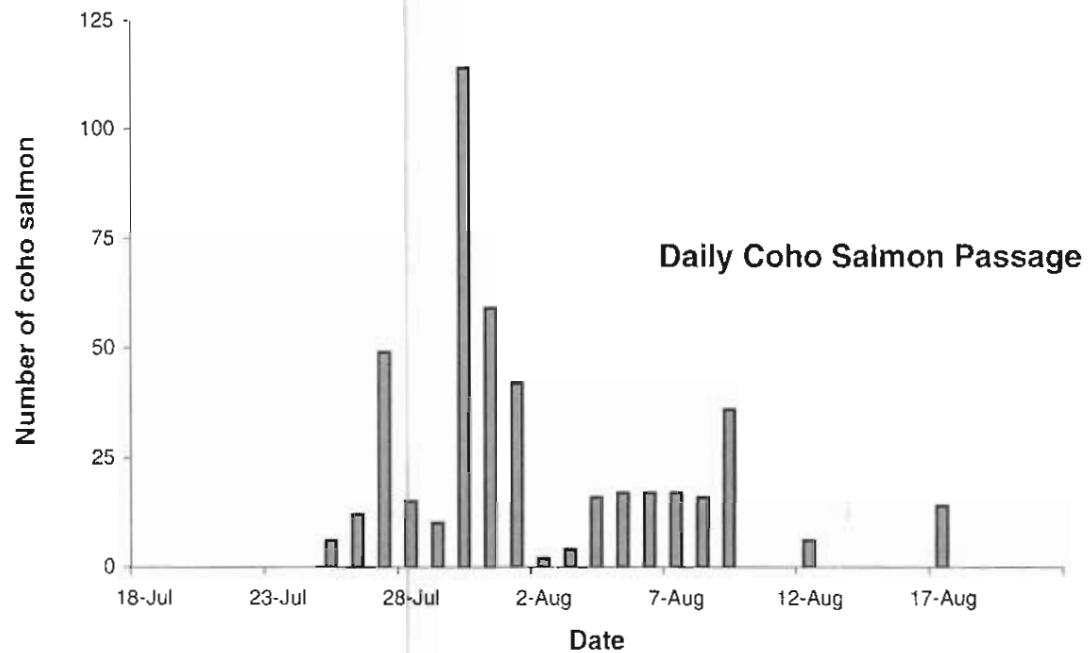


Figure 10. Cumulative coho salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

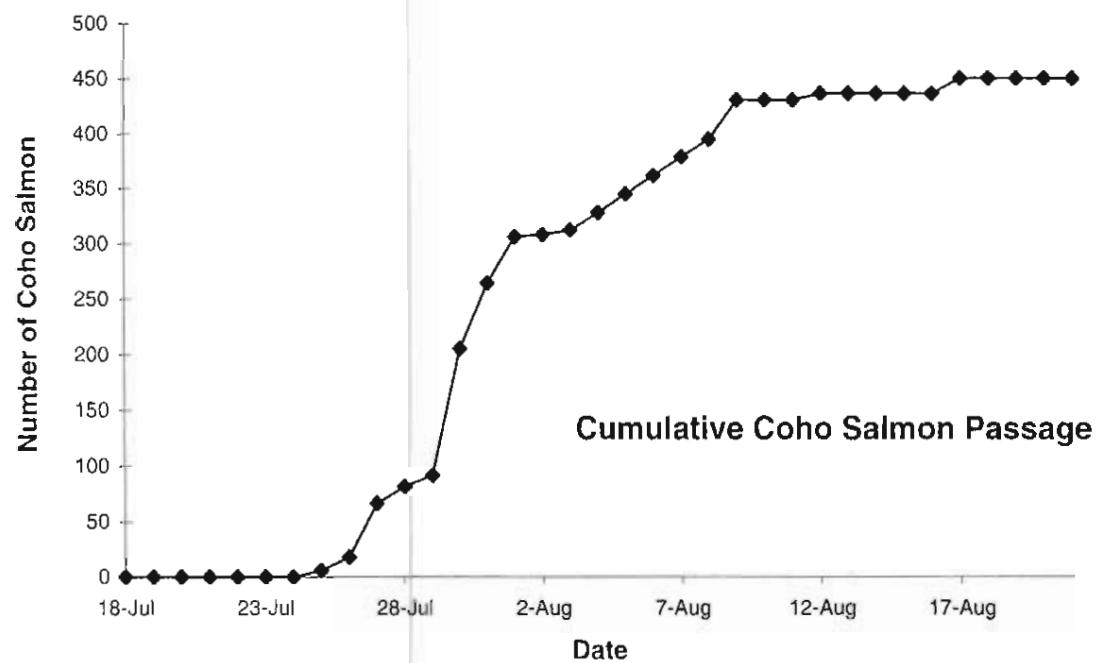


Figure 11. Diurnal pattern of combined chum and sockeye salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

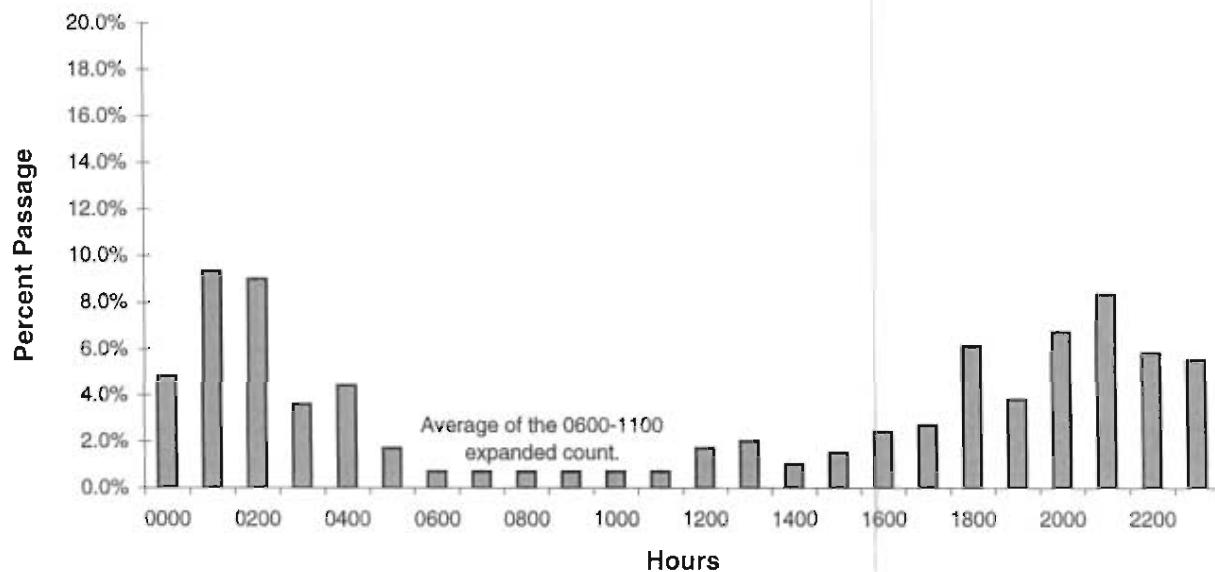


Figure 12. Diurnal pattern of pink salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

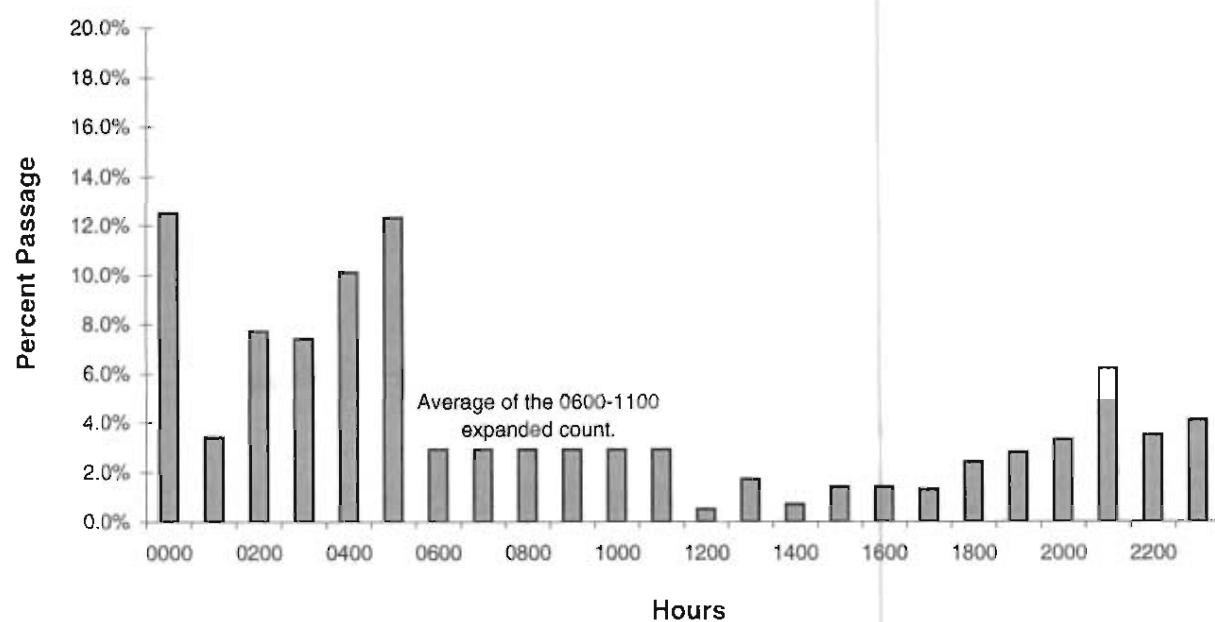


Figure 13. Diurnal pattern of king salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.

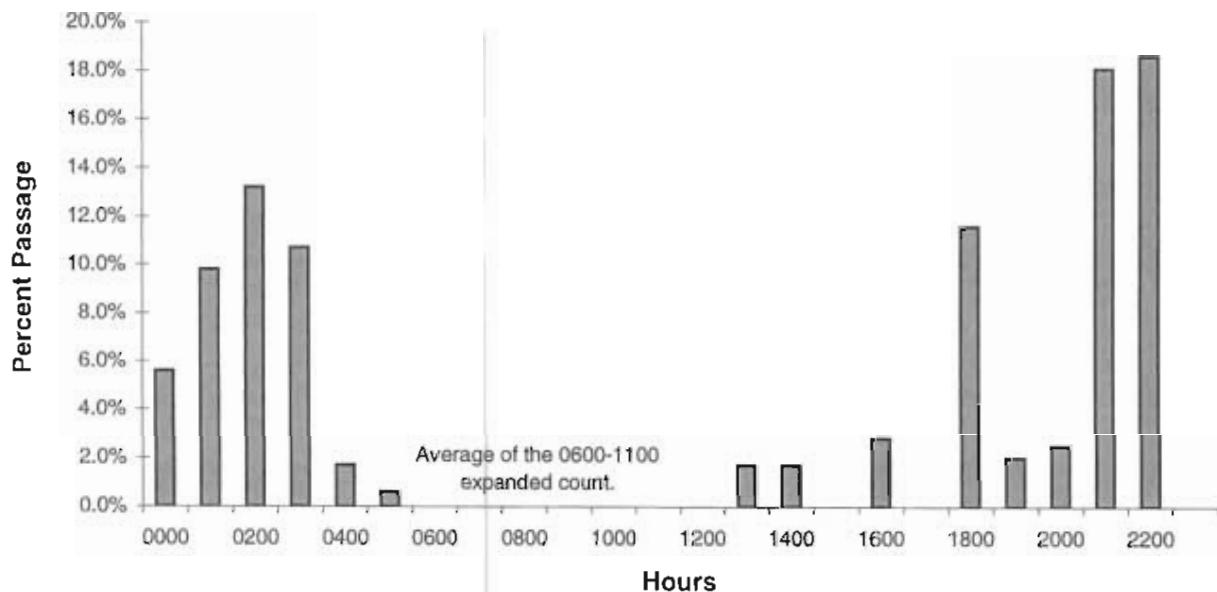
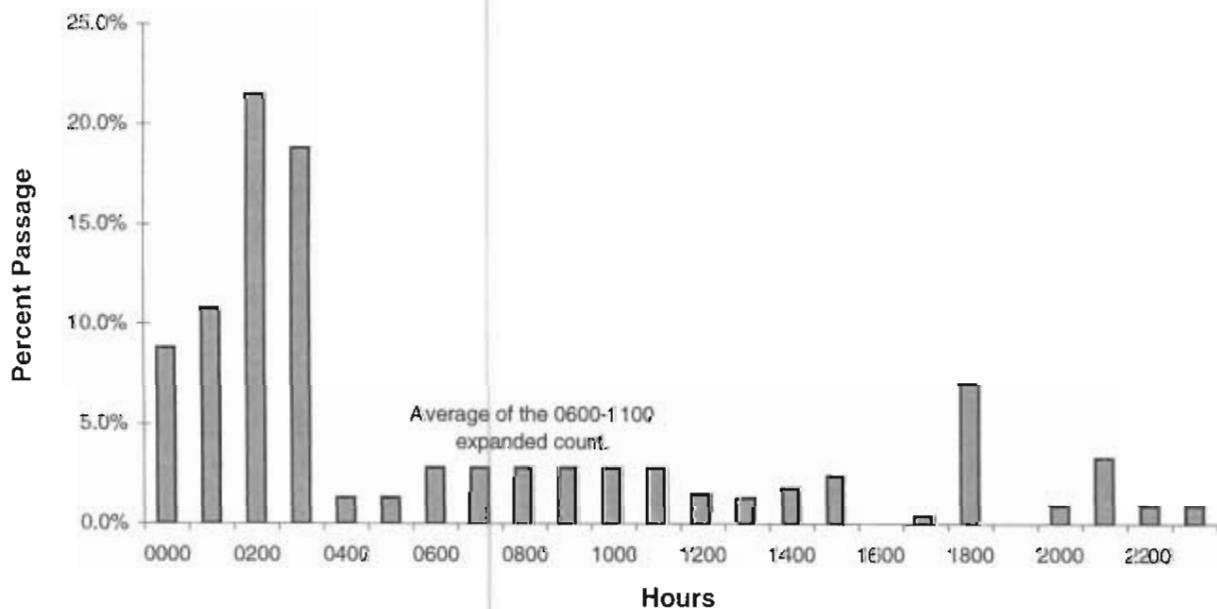


Figure 14. Diurnal pattern of coho salmon migration past the Pilgrim River counting tower, Port Clarence, 1997.



Appendix Table 1. Reported hourly chum salmon observations at the Pilgrim River counting tower, Port Clarence, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total	
12-Jul																										692	6.8%
13-Jul	60	60	4	0	6									192	0	6	0	2	66	52	106	40	0	0	0	594	5.8%
14-Jul	0		4	0	8	0							6	66	28	0	82	0	130	0	0	0	10	76	410	4.0%	
15-Jul	0	32	30	58	88								0	0	0	0	0	0	52	4	0	16	58	62	400	3.9%	
16-Jul	4	46	64	30	114								0	0	2	-4	0	0	0	14	0	58	110	0	438	4.3%	
17-Jul	0	6	86	142	126	26	0	2	0	0														388	3.8%		
18-Jul													0	0	0	0	0	26	204	6	150	208	72	6	872	6.6%	
19-Jul	20	54	24	0									0	0	2	0	0	34	8	0	358	538	52	16	1,106	10.9%	
20-Jul	52	116	58	28									0	0	0	0	0	0	34	20	2	26	184	76	596	5.9%	
21-Jul	28	78	56										0	0	0	0	0	52	78	42	24	0	0	8	368	3.6%	
22-Jul	22	82											0	0	0	0	0	0	0	0	92	12	40	34	282	2.8%	
23-Jul	24	76	94	52									0	0	0	0	0	4	0	0	0	0	0	0	76	326	3.2%
24-Jul	66	182	26	130	4	40	0	0	0															448	4.4%		
25-Jul																								0	36	0.4%	
26-Jul	0	2	92	14	98	18							0	94	0	8	46	6	108	126	6	74	26	38	756	7.4%	
27-Jul	0	0	10	30	10	54							-4	0	0	0	0	0	0	0	0	0	0	0	100	1.0%	
28-Jul	-8	4	14	76	14	2							0	0	0	0	14	-4	-6	2	4	0	0	0	112	1.1%	
29-Jul	18	40	0	0	0	0							6	0	0	0	0	10	0	-6	0	10	22	38	138	1.4%	
30-Jul	48	76	66	52	34	0	22	0	6	0	0	8	0	0	0	62	92	94	40	12	4	18	18	12	664	6.5%	
31-Jul																								0	0.0%		
1-Aug													0	12	2	14	6	24	0	0	0	0	0	12	70	0.7%	
2-Aug	26	24	48	58	16	0							0	20	0	8	0	-2	2	2	0	12	0	0	214	2.1%	
3-Aug			84	38									0	0	0	0	0	0	0	0	2	4	0	40	168	1.7%	
4-Aug	24	10																						34	0.3%		
5-Aug																								0	0.0%		
6-Aug																								0	0.0%		
7-Aug																								0	0.0%		
8-Aug													0	0	8	0	0	0	0	0	0	0	0	0	8	0.1%	
9-Aug	8	18	24	56	10	0							8	2	56	22	18	0	0	0	0	0	10	2	6	240	2.4%
10-Aug	0	12	0	82	66	-16							0	0	0	0	0	0	0	0	0	0	0	0	144	1.4%	
11-Aug	18	28	0	0	0	0							0	0	0	0	0	0	0	0	0	0	0	0	46	0.5%	
12-Aug	0	16	98	34	0	2							0	0	0	0	0	0	0	0	0	0	0	0	150	1.5%	
13-Aug	0	0	0	0	94	100							0	0	0	0	0	6	-2	22	0	0	0	0	220	2.2%	
14-Aug	0	6	8	28	24	18							0	6	4	0	0	0	0	6	0	0	0	14	114	1.1%	
15-Aug	72	16											0	0	0	2	0	-4					0	14	100	1.0%	
16-Aug	4	48	30	0									0	0	0	0	0	0	0	0	0	0	0	0	82	0.8%	
17-Aug	0	0	0	0	0	0							0	0	0	0	8	0	0	0	0	2	0	0	10	0.1%	
18-Aug	0	8	0	0	0	0							0	0	0	0	6	0	0	0	0	0	0	0	14	0.1%	
19-Aug	0	0	0	0	0	0							0	0	0	0	0	-10	0	0	0	0	0	-2	-12	-0.1%	
20-Aug	0	12	8	2	18	4	0	0	0	0	0	0	0	0	0	0	0	-4	0	0	-2	0	0	38	0.4%		
21-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
Total	488	1,052	924	914	722	256	22	2	6	0	0	0	8	208	200	140	172	276	280	762	552	812	1,036	696	638	10,164	
	4.8%	10.4%	9.1%	9.0%	7.1%	2.5%	0.2%	0.0%	0.1%	0.0%	0.0%	0.0%	0.1%	2.0%	2.0%	1.4%	1.7%	2.7%	2.8%	7.5%	5.4%	8.0%	10.2%	6.8%	6.3%	100.0%	

Appendix 1 Reported hourly red salmon observations at the Pilgrim River counting tower

Clarence, 1997.

Shaded areas indicate hours not counted

Date	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	Total	% of Total		
12-Jul																										0	0.0%	
13-Jul	4	0	0	0	0	0								8	0	0	8	0	2	12	2	2	0	0	0	38	4.0%	
14-Jul	0			0	0	0	0	0					0	4	4	0	18	0	12	0	0	0	0	0	38	4.0%		
15-Jul	0	4	0	0	0	14							0	0	0	0	0	0	0	0	0	0	0	10	54	5.7%		
16-Jul	0	8	0	0	0	0							0	0	0	0	0	0	0	0	0	0	20	26	54	5.7%		
17-Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
18-Jul														0	0	0	0	0	0	0	0	10	2	6	0	18	1.9%	
19-Jul	0	12	0	0										0	0	0	0	0	0	4	0	48	66	8	10	148	15.5%	
20-Jul	0	2	0	6										0	0	0	0	0	0	0	0	0	8	28	2	46	4.8%	
21-Jul	0	0	0											0	0	0	0	0	0	0	0	4	0	0	2	6	0.6%	
22-Jul	2	0												0	0	0	0	0	0	0	0	46	0	0	20	68	7.1%	
23-Jul	2	2	0	8										0	0	0	0	0	2	4	2	0	0	0	14	34	3.6%	
24-Jul	18	4	2	0	0	4	0	0	0															28	2.9%			
25-Jul																									0	0.0%		
26-Jul	0	0	0	0	0	0								2	-2	0	0	2	0	0	0	0	0	0	8	8	18	1.9%
27-Jul	0	6	0	0	0	2								4	0	0	0	0	0	0	0	0	0	0	0	0	12	1.3%
28-Jul	0	0	6	56	8	4								0	0	0	0	0	0	8	4	36	0	0	0	122	12.8%	
29-Jul	6	0	0	8	0	0								0	0	0	0	0	14	0	0	0	0	0	0	28	2.9%	
30-Jul	0	0	46	44	22	0	0	0	0	0	2	2	0	0	2	0	0	16	4	2	0	0	0	0	140	14.7%		
31-Jul																									0	0.0%		
1-Aug														0	2	0	0	0	0	0	0	0	0	0	0	2	0.2%	
2-Aug	0	0	8	2	0	0								0	0	0	0	0	0	6	2	0	0	0	0	18	1.9%	
3-Aug		-4	0											0	0	0	0	0	0	0	0	0	0	0	0	-4	-0.4%	
4-Aug	0	0																							0	0.0%		
5-Aug																									0	0.0%		
6-Aug																									0	0.0%		
7-Aug																									0	0.0%		
8-Aug														0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
9-Aug	0	0	2	6	0	0								4	2	6	0	2	0	0	0	0	4	2	0	28	2.9%	
10-Aug	0	0	0	6	0	0								0	0	0	0	0	0	0	0	0	0	0	0	6	0.6%	
11-Aug	0	0	0	0	0	0								0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
12-Aug	0	4	2	2	0	0								0	0	0	0	0	0	0	0	0	0	0	0	8	0.8%	
13-Aug	0	0	0	0	12	2								0	0	0	0	0	0	0	0	0	0	0	0	14	1.5%	
14-Aug	0	0	0	6	0	0								0	0	0	0	0	0	0	0	0	0	0	0	6	0.6%	
15-Aug	16	0												0	0	0	0	0	0	0	0	0	0	0	0	16	1.7%	
16-Aug	0	0	0	0										0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
17-Aug	0	0	0	0	0	0								0	0	0	0	6	0	0	0	0	0	0	0	6	0.6%	
18-Aug	0	0	0	0	0	0								0	0	0	0	0	0	-2	0	0	0	0	0	-2	-0.2%	
19-Aug	0	0	0	0	0									0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%	
20-Aug	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0.4%		
21-Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0%		
Total	48	44	64	144	56	12	0	0	0	0	2	2	18	8	10	8	44	22	46	10	146	100	88	82	954			
	5.0%	4.6%	6.7%	15.1%	5.9%	1.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	1.9%	0.8%	1.0%	0.8%	4.6%	2.3%	4.8%	1.0%	15.3%	10.5%	9.2%	8.6%	100.0%			